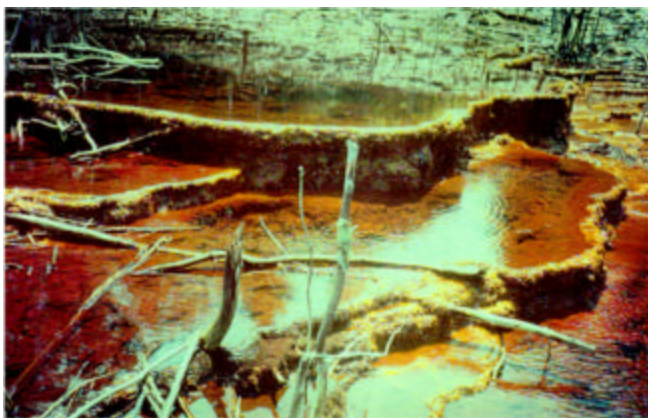


INTRODUCTION



This chapter conveys the local, state, and federal agency, as well as the private sector commitment to protect and improve the quality of surface and ground water impaired by resource extraction activities.

DESCRIPTION

The Tennessee mining industry has been very active since the pre-Revolutionary War era. According

to U.S. Bureau of Mines annual production and revenue statistics, the Tennessee mineral industry consistently ranks 15th or 16th in the nation in production revenues.

Tennessee's mineral industry is also varied according to both commodity type and mining technique. The state is the leading producer of ball clay and gemstones, in the western grand division. Tennessee is also the second leading producer of zinc, deep mined in the middle and eastern grand division.

The state also has surface and deep mine operations that extract large quantities of crushed limestone in the middle and eastern grand divisions, dredges sand and gravel across the entire state, and mines barite in the eastern grand division to a far lesser degree. Tennessee is also a producer of bituminous coal and oil and gas in the middle and eastern grand divisions. Further definition and delineation of these resource extraction activities are in Appendix D.

The environmental effects on water quality and aquatic life from these activities can be quite serious. Fortunately, many existing mining activities are regulated by National Pollutant Discharge Elimination System (NPDES) permitting programs. From the mid-1700s until the implementation of the Surface Mining Control and Reclamation Act (SMCRA) of 1977, many thousands of acres, were not reclaimed. A significant portion of these sites, especially in the Cumberland Mountains, warrant significant remediation efforts to improve in local water quality. Unreclaimed former surface mining sites are releasing highly acidic and toxic surface and ground waters to local receiving streams. Water quality and aquatic life, including endangered species, in sections of the Big South Fork of the Cumberland River have been adversely impacted as a result of acid mine drainage and sedimentation from tributary streams.

Basically, six mining/reclamation scenarios exist in Tennessee.

- mining operations which are regulated by the U.S. OSM through SMCRA, TDEC-WPC-Mining the section under NPDES, TDEC-WPC-Natural Resources section under ARAP, and US Army Corps of Engineers under Section 404. This includes ball clay, sand and gravel (Shelby County), barite, and bituminous coal.

1.5 RESOURCE EXTRACTION



- sand and gravel dredging (outside Shelby County) which is not regulated by OSM under SMCRA, but is regulated for stream access by USACE and TDEC through Section 404 and ARAP.
- mineral commodities (e.g. crushed limestone, lime, zinc, dimension stone, and sand and gravel, except in Shelby Co.) are exempted by Tennessee state law due to their importance to the agricultural and construction industries.
- Pre-SMCRA (1977) mines which can be remediated by TDEC-WPC-MS/AML under performance bond forfeiture monies, TWRA under Appalachian Clean Streams Initiative (ACSI) monies, TVA under federal allocations, NRCS under PL566 funds, and/or TDA-NPS Program under 319(h) funds.
- pre-SMCRA mines which have either naturally healed over time or have been deemed that they will do so in a fairly short order of time or those where cost effective remediation will never be possible.

EXTENT OF PROBLEM

When abandoned and un-reclaimed mining and oil and gas activities are left unchecked the environment suffers from increased sediment, toxic metal, and hydrocarbon loadings as well as very low or extremely high pH readings, high total suspended solids, and habitat loss. It is this wide range of pollutants (causes), as specified by the 303(d), List, that TDA-NPS Program and its partners are remediating and plan to continue to remediate for the foreseeable future.

Many of the streams draining un-reclaimed mined areas are impacted or impaired by runoff and subsurface flow originating at the site. Those sites being mined in a manner which abide by SMCRA and other applicable state laws generally are not impacting or impairing receiving streams or groundwater. Even so, a significant number of receiving stream miles have been impacted or impaired and have been designated on the 303(d) List generated every two years by TDEC-WPC. The following list is a compilation of these streams which will be the targets of remediative efforts through 319 funds or other state and federal funding sources.

All project proposals submitted to EPA are first compiled into a draft work plan. Summaries of each of the proposed projects are sent to a clearinghouse committee. (In accordance with Executive Order 12372–40 CFR Part 29). The Committee is comprised of several state agency representatives, including TDEC-WPC, as well as all nine (9) area development districts. Representatives of each of these agencies are given the opportunity to comment upon these proposals. The TDA-NPS Program considers comments made by these agencies and submits copies of the agency responses to EPA.

Approximately, 9.4 percent of the 352 streams found on the 1998 303(d) List or 34 streams are impaired by resource extraction issues. For further details as to what types of pollution can and are being created by Tennessee's wide range of resource extraction please see Appendix C.

1.5 RESOURCE EXTRACTION

| | |
|-----------------------|---------------------------------|
| WATERSHED NAME | RESOURCE EXTRACTION TYPE |
|-----------------------|---------------------------------|

8-digit HUC - Cumberland River

| | | |
|-------------------|------------------------------|-----------|
| TN0211000200918.6 | Drakes Cr. | oil & gas |
| TN051301010091.0 | Capuchin Cr. | coal |
| TN05130104032 | White Oak Cr. | coal |
| TN05130104038 | Brimstone Cr. | coal |
| TN05130104044 | Straight Fork Cr. | coal |
| TN051301040501.9 | Bear Cr. | coal |
| TN05130104519.3 | Roaring Paunch Cr. | oil & gas |
| TN05130105001 | Obey R. | coal |
| TN05130105023 | Big Piney R. | coal |
| TN02130107023 | Collins R. – Dry Cr. | coal |
| TN05130107 | Collins R. – Big Cr. Lake | coal |
| TN05130108024 | Collins R. – Rocky R. | coal |
| TN05130108027 | Collins R. – Cane Cr. | coal |
| TN05130108 | Collins R. – Spencer City L. | coal |

8-digit HUC - Tennessee River

| | | |
|-------------------|---------------------------------|----------------|
| TN06010104019 | Holston R. – Big Flat Cr. | limestone |
| TN06010104mossycr | Holston R. – Mossy Cr. | zinc |
| TN060101080102.0 | Nolichucky R. – Davy Crocket L. | feldspar |
| TN060101080109.0 | Nolichucky R. – Dry Cr. | sand |
| TN06010207001 | Clinch R. Coal Cr. | coal |
| TN06010208005 | Emory R. Flat Cr. | coal |
| TN06010208020 | Emory R. Crab Orchard | coal |
| TN06020001064 | Soddy Cr. | coal |
| TN06020001068 | North Chickamauga | coal |
| TN06020001076 | Suck Cr. | coal |
| TN06020002001 | Hiwassee R. – Ocoee R. | copper, sulfur |
| TN06020002001T | Hiwassee R. – North Potato Cr. | copper, sulfur |
| TN06020004013 | Sequatchie R. – Hills Cr. | coal |
| TN0603001grundy1 | Sequatchie R. – Grundy L #1. | coal |
| TN0603001grundy2 | Sequatchie R. – Grundy L #2 | coal |
| TN06040003023 | Duck R. – Sugar Cr. | phosphate |
| TN06040003034 | Duck R. – Rutherford Cr. | phosphate |
| TN08010203001 | Forked Deer R. – South Fork | sand & gravel |

8-digit HUC - Mississippi River

| | | |
|-------------------|-------------|---------------|
| TN0801010000102.3 | mainstem | sand & gravel |
| TN08010100002 | McKellar L. | sand & gravel |



SOLUTIONS

Proper BMPs for use in resource extraction activities, whether for active operations or reclamation efforts, are solely dependent upon the means of extraction (e.g. surface or deep mining, dredging, or drilling). For a detailed listing of these BMPs, see 'Solutions' in Appendix D.

The TDA-NPS Program has participated in a multi – agency technical team. This team has addressed the critical issue of acid mine drainage (AMD) originating from unreclaimed, abandoned surface and deep coal mines in and near the federally managed Big South Fork (of the Cumberland) National River and Recreation Area. This team has been facilitated by the USDA-NRCS and produced a Watershed Plan/Environmental Assessment for the Restoration and Enhancement of the Bear Creek Watershed.

Existing and planned 319 projects are contributing in the remediation of these AMD problems. The TDA-NPS Program has assisted in delineating this as a watershed earmarked for the implementation of FY-99 incremental funds. This effort was designed to completely resolve AMD problems within a subwatershed once ancillary reclamation efforts promised by USDA-NRCS were completed. The TDA-NPS Program plans to continue to assist in any means possible to remediate the existing water quality problems; in the Big South Fork Cumberland River Watershed.

COOPERATING PARTNERS

| <u>Partners</u> | <u>Abbreviation</u> |
|--|----------------------------|
| Kennecott Energy Company | |
| Sequatchie Valley Coal Company | SVCC |
| Kentucky Department for Environmental Protection | |
| Division of Water | |
| Nonpoint Source Program | KY-NPS |
| Local landowners/organizations | |
| Mining companies | |
| North Chickamauga Creek Conservancy | NCCC |
| Save Our Cumberland Mountains | SOCM |
| Sequatchie Valley Coal Co. – Kennecott Inc. | SVCC |
| Tennessee Citizens for Wilderness Planning | TCWP |
| Tennessee Department of Agriculture | TDA |
| Division of Administration & Grants | A&G |
| Ag Resources Conservation Program | ARC |
| RAMP efforts | RAMP |
| Tennessee Department of Environment and Conservation | TDEC |
| Division of Geology | TDG |
| TN Oil & Gas Board | TOGB |
| Division of Water Pollution Control | WPC |
| Aquatic Resources Alterations Permit | ARAP |
| Environmental Assistance Centers | EACs |
| Land Reclamation Section | LRS |
| Mining Section | MS |

1.5 RESOURCE EXTRACTION



| | |
|--|-------------|
| Division of Water Supply | DWS |
| Source Water Assessment Program | SWAP |
| Tennessee Resource Conservation and Development Councils | TNRC&D |
| Buffalo – Duck RC&D Council | B – D RC&D |
| Hull - York Lakeland RC&D Council | H – YL RC&D |
| Tennessee Valley Authority | TVA |
| Tennessee Wildlife Resources Agency | TWRA |
| US Army Corps of Engineers | USACE |
| USDA - Natural Resources Conservation Service | NRCS |
| USDI – Fish and Wildlife Service | F&WS |
| USDI - Office of Surface Mining | OSM |
| USDI - National Park Service-Big South Fork NRR | USNPS |

As previously listed, many agencies, organizations, and companies have existing programs relating to resource extraction. The following text further defines these programs by means of extraction.

Active and Abandoned Surface/Subsurface Mining (Coal and Non - Coal) **Kennecott Energy Company – Sequatchie Valley Coal Company (SVCC)**

SVCC is a wholly owned subsidiary of Kennecott Energy Company and has been very active in the reclamation of hundreds of acres of coal surface mined lands in northern Sequatchie County of southeast Tennessee. Much of the treated runoff originating from portions of SVCC's recently mined and reclaimed properties runs across unreclaimed lands on its way to Dry Creek, a tributary of the Collins River located within the Cumberland River watershed. According to NPDES regulations, SVCC is not liable for the remediation of these lands, but finds it prudent to do so despite the projected costs. SVCC has committed to provide funding to a proposed 319 remaining project equal to the match amount already obligated by TDEC-WPC. SVCC would also like to treat additional sites on this property and encourages other mining companies in the region to do the same by welcoming them to view the final product of this 319 project.

Local landowners/organizations

Oftentimes, land that needs to be reclaimed is owned by a private landowner who has no mineral rights but would like to see the land reclaimed so it can be used for other purposes. This is especially the case when the land in question is in close proximity to a rapidly growing urban center. During cases like this, the landowner can be a great partner by allowing the reclamation activity to be completed and then making certain that all remediative work is kept protected to ensure local water quality improvement.

Local concerned citizens who have formed a local citizens group can also be partners by serving as a source of public awareness and actually promoting the initiation of reclamation activity. The TDA-NPS Program has and will continue to partner with such organizations to bring about the improvement of local water quality.

TDEC – Water Pollution Control – Land Reclamation Section (LRS)

This agency administers the abandoned coal mine reclamation program utilizing state and federal dollars. LRS has partnered with TDA - NPS Program in Scott County administering 319(h) funds at several abandoned coal mine sites. LRS is in the process of reclaiming AMD lands in the Chattanooga area as well as proposing remaining work in cooperation with Sequatchie Valley Coal Company. LRS strives to promote these types

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of conservation and water quality improvement efforts throughout Tennessee's coal mining region.

LRS also performs reclamation work in non-coal areas across the state. In the FY-99 base grant, a 319 funded gravel pit remediation project, involving several local agencies, will assist in improving water quality. As part of this project, road improvements and outreach activities will be completed as demonstrations to surrounding county officials.

TDEC – Water Pollution Control – Mining Section (MS)

This agency regulates the active mining industry, where applicable, through the NPDES program. The agency also administers the non-coal regulatory program, and Tennessee coal mining law of 1972 and its 1980 amendment (bond collection programs). Surface disturbances associated with underground mining and tailings associated with an NPDES permitted discharge are also regulated.

Tennessee Valley Authority (TVA)

The TVA maintains land reclamation provisions in coal purchase contracts and monitors TVA's coal suppliers for compliance with state and federal reclamation laws. Between 1976-80 TVA sponsored an "orphan" or abandoned coal mine land reclamation program with Tennessee that reclaimed 6,032 acres in 13 counties. Over the years, TVA has been involved in abandoned non-coal mine land reclamation programs in the Copper Basin in Polk County; manganese mines in Johnson and Carter counties; and, phosphate mines in Maury and Hickman counties. The Cooperative Copper Basin project has been very successful in reclaiming and reforesting many thousands of acres of land denuded by crude copper smelting practices that occurred between the 1850s and 1930s, throughout the basin drained by the Ocoee River.

Tennessee Wildlife Resources Agency (TWRA)

This agency has been reclaiming AMD sites in Tennessee's coal mining region for the past nine years. A ten-year program funded in part by the state and the EPA/OSM Appalachian Clean Streams Initiative (ACSI) was utilized. TWRA often contracts with LRS to do the actual reclamation work at their Obed River watershed sites.

US Army Corps of Engineers (USACE), 404 Permit

The USACE permits, through the Section 404 regulatory process, active mining when activities (e.g. stream crossings, bridge construction, sediment basins, or channelization projects) involve the discharge of dredged or fill material below the ordinary high water mark of the stream. Prior review of plans and inspection of the site by USACE are required before any work can be initiated. Failure to do so or disobedience of the USACE requirements places the operator in violation of the law and subject to work stoppage as well as a fine.

The USACE is supporting wetland creation or restoration, stream channel restoration, stream bank stabilization, development of watershed management plans, riparian corridor restoration, and detention and treatment of storm water runoff, all of which are treatments used in AML/AMD reclamation efforts, through the Section 206 Ecosystem Restoration Program. This program allows the USACE to assist state and local governments and many nonprofit entities in the planning, design, and construction of projects for aquatic ecosystem restoration and protection. Eligible projects include in AML/AMD reclamation.

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USDA – Natural Resource Conservation Service (NRCS)

This agency administers ACSI funding from OSM and the Rural Abandoned Mines Program (RAMP), a reclamation program once funded by OSM. NRCS has completed the 'Watershed Plan/Environmental Assessment for the Restoration and Enhancement of the Bear Creek Watershed' through multi-agency partnering efforts and is procuring additional funds for this through PL566. Their efforts would compliment an EPA FY-99 Incremental 319 grant targeting the West Branch of the Bear Creek.

US Fish & Wildlife Services (F&WS)

The F&WS is the principal federal agency responsible for conserving, protecting, and enhancing fish, wildlife, and plants and their habitats for the continuing benefit of the American people. These goals are accomplished through Federal programs relating to migratory birds, threatened and endangered species, certain marine mammals, inland sport fisheries, specific fishery and wildlife research activities, and management of the National Wildlife Refuge System and National Fish Hatchery System.

Programs implemented by the Tennessee/Kentucky Field Office are concentrated in the areas of endangered species recovery, habitat restoration on public and private lands, contaminant assessments, rare species surveys and monitoring, wetland and other habitat characterizations, and evaluations of the effects of proposed water and land development projects, including surface and underground mining, on fish and wildlife resources and habitats.

Contaminant assessments include the collection of fish and wildlife tissue, egg, and blood samples, as well as water and sediment samples, for analysis of reproductive hormones, organic and inorganic contaminants, and physicochemical parameters. Fish and wildlife health assessments are also routinely performed. These activities are short term in duration and are generally not performed more than once in one annual cycle. The resulting data is utilized to determine the diversity of resources present and to assess potential exposure and effects from contaminants and other ecological stressors. Typically, reports are prepared and distributed to interested and participating federal, state, and local entities.

USDI – Office of Surface Mining (OSM)

This agency regulates and oversees state regulation of the coal mining industry Pursuant to Public Law 95 - 87. Because Tennessee returned primacy of surface mining regulation, an OSM field office staffed with approximately 60 professionals is located in Knoxville. All coal surface mines are regulated by this office. This agency also regulates the surface disturbance associated with underground mining. OSM provided AML fund to the state of Tennessee through the AML discretionary fund. Therefore, the state of Tennessee does not receive a fixed amount each year. Rather, the amount may vary from year to year based on the state's requests and other OSM requests for funding from the Discretionary Fund.

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Dredge Mining

US Army Corps of Engineers (USACE)

The USACE issues permits under the authority of Section 10 of the Rivers and Harbors Act of 1899, for dredging that occurs within navigable waters of the US. In non-navigable waters, the extraction of dredged material does not require USACE approval if the material is completely removed from the waterway. If the dredged material is discharged in the stream bed or if dredged materials are relocated from one area to another within the stream bed, these activities would then require USACE approval pursuant to Section 404 of the Clean Water Act.

Section 206 Ecosystem Restoration Program Section 206 of the Water Resources Development Act (WRDA) of 1996 allows the Corps to assist state and local governments and many nonprofit entities in the planning, design, and construction of projects for aquatic ecosystem restoration and protection. Eligible projects include wetland creation or restoration, stream channel restoration, stream bank stabilization, development of watershed management plans, riparian corridor restoration, and detention and treatment of storm water runoff. The Corps pays 65% of project costs, not to exceed \$5 million. The sponsor must provide 35% of project costs and operate and maintain the completed project. This program is not limited to Corps of Engineers lands or properties.

Section 1135 of the WRDA of 1986 authorizes the Corps of Engineers to improve environmental quality by focusing on wetland restoration and fish and wildlife habitat improvements. The thrust of this program is focused on environmental restoration opportunities on Corps of Engineers lands and projects. The Corps will pay 75% of planning, design, and construction costs. Section 1135 projects are limited to 7.5\$ million, with the federal share capped at \$5 million.

TDEC – Water Pollution Control – Natural Resources Section (NRS)

All eight TDEC-WPC EACs issue permits and periodically inspect all other operations regardless of size of waterway. Any alterations involving stream habitat must be first approved by this agency through its administration of the state Aquatic Resources Alteration Program (ARAP).

Petroleum Activities (drilling, storage, and transport)

TDEC – Division of Geology – TN Oil & Gas Board (TOGB)

This agency permits and regularly inspects active oil and gas operations and maintains an inventory of abandoned wells. The State Oil and Gas Board established abandoned well reclamation funds in TC4-60-1–404. It also is in charge of the Orphan Well program, which remediate abandoned wells contaminating surface waters or subsurface aquifers.

Tennessee Wildlife Resources Agency (TWRA)

This agency has statutory authority to levy fines if a fish kill occurs as a result of contamination (i.e. brine disposal in streams).



Other Funding Sources

TDEC-Division of Community Assistance (DCA)

The State Revolving Fund (SRF) is managed by TDEC-DCA. This agency has expressed the desire to expand its funding to NPS projects. Several meetings have been held between the SRF Program, WPC, and TDA-NPS to discuss directing SRF funding towards nps issues. As this point in time, no reclamation projects have been funded by the SRF. For more information pertaining to the acquisition of such funds, interested parties would need to contact the TDEC-DCA office in Nashville (615/532-3568).

TDEC-Water Pollution Control-Land Reclamation Section (LRS)

The LRS has the authority to utilize mining forfeiture bond funds collected through the state NPDES program. This funding has been applied to both AMD and non-AMD reclamation for the past ten (10) years. For more information pertaining to the acquisition of such funding, interested parties would need to contact the LRS office in Knoxville (865/594-6035).

US Army Corps of Engineers (USACE)

A recent addition to the USACE is the Section 206 Ecosystem Restoration Program. This program allows the USACE to assist state and local governments and many nonprofit entities in the planning, design, and construction of projects for aquatic ecosystem restoration and protection. Eligible projects include wetland creation or restoration, stream channel restoration, stream bank stabilization, development of watershed management plans, riparian corridor restoration, and detention and treatment of storm water runoff, all of which are treatments used in AML/AMD reclamation.

Another USACE program is the Section 1135 that authorizes it to improve environmental quality by focusing on wetland restoration and fish and wildlife habitat improvements. These are also needed in AML/AMD restoration efforts.

USDI-Office of Surface Mining (OSM)

The OSM has the ability of obtaining limited amounts of funding from the Appalachian Clean Streams Initiative. Presently, the Tennessee Wildlife Resource Agency has been able to capture some of this funding for stream habitat and reclamation work in AMD impacted streams. For information pertaining to the acquisition of such funding interested parties would need to contact the U.S. Office of Surface Mining located in Knoxville (865/545-4103).

Additional funding sources for environmental projects are listed in the Catalog of Federal Funding, which can be found at: www.aspe.os.dhhs.gov/cfda

CURRENT 319 PROJECTS

Resource extraction reclamation projects have been funded since the program's inception. With only one exception, each of these projects has addressed acid mine drainage originating from abandoned, un-reclaimed, pre-law coal mines on the Cumberland Plateau. Since the first 319 project was partnered with LRS, only one project has ever been partnered with any other entity.

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Through many years of experience, LRS has acquired valuable knowledge of the proper means of addressing AMD issues. The staff also cooperates with the Knoxville Environmental Assistance Center (EAC). The Knoxville EAC employs a staff biologist who is a recognized expert in the field of AMD treatment. TDEC also manages the state's performance forfeiture bond that enables mining remediation efforts across the entire state.

Realizing that AMD is not the only resource extraction issue, a project has been submitted to address gravel (chert). More of these projects will be initiated to improve local water quality as well as provide the impetus for local entities to perform such projects.

Although oil and gas production has never been very significant in the state, there are many abandoned wells/boreholes left unplugged across middle and east Tennessee. These wells cause water table fluctuations and subsurface contamination due to the conveyance potential of the open borehole. Efforts are currently in the planning stage to address abandoned wells impacting 303(d) listed streams.

The following is a list of current and proposed 319 projects for Resource Extraction.

| Grant Yr. | Project Title | Location |
|------------------|--|---------------------|
| FY-90 | AMD Remediation in Bear Cr. of BSF | Scott Co./NE. TN |
| FY-92 | AMD Remediation in Bear Cr. of BSF | Scott Co./NE. TN |
| FY-93 | AMD Remediation in Bear Cr. of BSF | Scott Co./NE. TN |
| FY-96 | AMD Remediation in N. Chickamauga Cr. | Hamilton Co./SE TN |
| FY-99 | Morgan Cr. Chert Pit/AML Proj. | Hickman Co./M. TN |
| FY-99 | prop. O&G borehole & site remediation/grant pool | Undetermined/M. TN |
| FY-99 | NPS water quality assessment by TDEC | Statewide |
| FY-99 (UWA) | West Br. of Bear Cr./AMD Remediation Proj | Scott Co./NE. TN |
| FY-99 (UWA) | Pre-BMP monitoring by TDH-Lab Services | Scott Co./NE. TN |
| FY-2000 Dry Cr | Watershed Restoration/Remining Proj | Sequatchie Co./E TN |

AREAS FOR PROGRAM EXPANSION

The Resource Extraction Working Group recommends the following program areas for expansion.

Surface and Subsurface Mining
Active Surface Mining (Non-Coal)

TDEC regulates active non-coal mines by issuing NPDES permits and mining permits for mining of non-exempt minerals. Exemption of additional minerals from regulations by the mining act may further exacerbate NPS pollution and should be seriously reconsidered. The lead agency is TDEC-WPC.

1.5 RESOURCE EXTRACTION**Abandoned Surface and Subsurface Mining (Coal)**

LRS estimates that 20 million dollars will be necessary to address the critical acreage of abandoned coal surface mines in the Abandoned Mine Land Inventory which contribute to environmental degradation. Currently, the state funded program (one million dollars per year for ten years (ten million dollars)) is leaving a critical funding shortage of ten million dollars. The lead agency in the state for abandoned coal mine reclamation is LRS which performs much reclamation on AML/AMD sites throughout the coalfields. This type of effort needs to be accelerated with the assistance of other entities at the local, state, and federal levels. Coordinating agencies include: NRCS, OSM, TVA, and TWRA.

AMD from the abandoned underground coal mines is probably one of the worst sources of ground water contamination in the coal mining region. The fracturing of sandstone caps as a result of past blasting subsidence, and a network of tunnels and pillars in acid bearing shales make for a complex intermingling of aquifers; it results in ground water contamination which often manifests itself miles from the source.

Abandoned Surface and Subsurface Mining (Non-Coal)

There are currently no significant non-coal reclamation programs in Tennessee. The TVA and its cooperators have a cooperative re-vegetation program at Copper Basin in Polk County. There is a critical need for an updated non-coal AML inventory with cost projections, and funding of a non-coal reclamation program on-the-ground. The lead agency in the state for non-coal programs is LRS. Coordinating agencies include NRCS and TVA.

There are thousands of acres of abandoned non-coal surface mines. TVA and cooperators, including small private landowners, completed reclamation on 276 acres of abandoned manganese mines in Johnson and Carter counties in northeast Tennessee and 146 acres of abandoned phosphate mines in Maury and Hickman counties of middle Tennessee.

Siltation, acidity, and heavy metal pollution resulting from erosion of denuded lands in southeast Tennessee's Copper Basin is listed as one of the high priority water resources problems in a TVA report entitled, "Water Resources Management in the Tennessee Valley." This land was completely denuded by more than a century of copper mining and associated smelting activities. TVA had an early historical involvement in re-vegetating the Copper Basin during the 1930s and 40s. In the early 1980s, it joined with Tennessee Chemical Company (TCC), the predecessor of the current owner, Boliden Intertrade (BIT), to extend reclamation activities. This area is currently being investigated for potential inclusion into Tennessee's Superfund Program or may be listed on the Federal National Priority List. (Comprehensive Environmental Research, Compensation and Liberty Act.)

Since 1984, TVA and its cooperators have reclaimed 10,517 acres with re-vegetative treatments and installed two major surface water sediment control structures. They also have prepared a master treatment plan for re-vegetation of the remaining 2,095 acres of partially vegetated lands. The remaining problem area in need of treatment is about seven percent of the original 32,000 acres. A potential 319 project is possible since TVA was recently privatized. (This could present itself as a potential 319 project when TVA

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match status favorably changed because TVA stopped receiving congressional appropriations.)

There may be a need for the development of informative outreach materials that would address the AML/AMD issues as well as the opportunity for local entities to become more involved in this effort. The state of Alabama currently has a conglomerate of SCDs that address minor AML/AMD issues too small for the state and federal agencies to address.

There also needs to be an increased effort in locating additional funding sources such as The Nature Conservancy, the Brownfields program, as well as EPA and others.

Petroleum Activities

Resources are needed to plug abandoned oil and gas wells and reclaiming storage tank sites. These abandoned wells and sites create significant impacts to local ground water resources. The lead agency is the TDEC–DG-TOGB. Coordinating agencies include EPA, TWRA, TDEC-DWS, and TDEC-WPC.

TDA-NPS Program

The TDA-NPS Program will seek new partners in the quest for funding more resource extraction activities. The first opportunity to be investigated will be existing partners such as the NRCS, TVA, US Coast Guard, USF&WS, US-OSM/ACSI, USBM, TDEC-SRF Program, TWRA, SCDs, RC&D councils, development districts, county governments, and local environmental and citizen organizations. This action will require the Resource Extraction working group to become broader in membership and more active to the point of initiating a productive forum for the exchange of ideas and the growth of partnering efforts.

The second opportunity to be investigated will be grants located within agencies and organizations that are presently not partners (i.e. TDEC-DCA/State Revolving Fund). This action will require TDA-NPS Program to investigate other agencies and organizations in a manner that will reveal all of the available funds as well as how they can be used.

Additional funding sources for environmental projects are listed in the Catalog of Federal Funding, which can be found at: www.aspe.os.dhhs.gov/cfda

WATER QUALITY MONITORING & ASSESSMENT

The 319 funding has been designed to assist TDEC-WPC statewide monitoring efforts. This development will enable TDEC-WPC to dedicate more staff time to intensively monitor surface water in point source impacted areas of Tennessee. These funds will also be used to analyze suspended solids, pH, acidity, and heavy metal concentrations in AMD areas.

The TDEC-WPC Watershed Management approach is based upon a five-year cycle in which every 8-digit HUC watershed is monitored. Through this effort, TDEC-WPC should be able to provide a much clearer picture as to where AMD and sediment

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problems are originating, thereby affording the 319 Program with a better working knowledge as to where to implement BMPs.

The success of TDEC-WPC's efforts should become evident in the near future as monitoring efforts in the Emory River. While combining existing data with recently collected data, this effort should reveal much needed information from the coal mining region of East Tennessee.

Additional data will also be available as students located in resource extraction affected watersheds begin to be involved with TDA's Instream Education (ISE) program. This program provides teachers and students with the instruction they need to initiate monitoring programs. Although it is unlikely that these efforts would ever be considered by TDEC-WPC as data acceptable for 303(d) assignments, it could serve as an indicator where additional BMP implementation work needs to be done. TDA-NPS will be in the position to distribute its instructional ISE material as early as 2000.

ENFORCEMENT MECHANISMS

All proposed mining sites are first reviewed by TDEC-WPC for NPDES permit issues as well as by USACE for 404 and wetland issues. The submitting mine operator is instructed as to what BMPs to install as well as how to install them. Sites visits are made by TDEC-WPC in advance to assure that the most effective BMPs are proposed in the best possible locations. During mining operations, these BMP sites are inspected on a regular basis to ensure that water quality is being adequately protected.

Every operator is required to post a mining performance forfeiture bond which is returned to them after successfully completing the project in accordance with the clean water BMP parameters set forth prior to mining. If the operator should fail to completely reclaim the site, then TDEC-WPC is required by law to withhold the bond. The operator has an opportunity to rectify the situation if significant water pollution has not already occurred. If this is not done, then the bond is kept by the state and is used to fund qualifying reclamation efforts across the state.

The state managed ARAP program requires any plans for affecting a stream be reviewed by TDEC-WPC. If the intentions are not within set standards mining plans or mine reclamation plans must be modified to remain in accordance with the ARAP standards. Those operations that do not are subject to a severe fine.

Currently, a state and federal reclamation program, funded at a level of approximately \$1,500,000 per year, addresses abandoned coal mines. There are more than 46,000 acres of abandoned surface coal mines, as well as hundreds of abandoned underground mines, throughout the coal producing Cumberland Plateau. Of this acreage, more than 11,000 acres have been assessed by LRS as needing immediate attention.

MEASURES OF SUCCESS

An annual review of the success of Resource Extraction reclamation projects will be initiated to assure that 319 and matching funds are being expended in the most effective manner. The existing Resource Extraction working group, comprised of local, state, and

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federal entities, will need to closely examine water quality data collected in impacted streams to determine if the scope of the projects need to be revised.

During these annual meetings, strengths and weaknesses of the statewide effort should be determined and, through interaction of these entities, partnering efforts should be modified to better contend with the remaining Resource Extraction issues. The removal of 303(d) listed streams because of BMP implementation causing them to support their designated uses and the level of agency, local organization, and citizen involvement in BMP implementation and water quality assessment should be the leading measures of success.

MILESTONES**Long Term Goal 1.**

Hold regularly scheduled meetings with stakeholders, to create new partnerships, to strengthen existing partnerships, and to foster greater trust, commitment and accountability.

- **Action 1:** The Resource Extraction Working Group (REWG) will meet semi-annually.
 Lead: TDA-NPS Program
 Key partners: Mining companies; Local landowners; Local SCDs; TDEC-TOGB; TDEC-WPC-LRS; TDEC-WPC-MS; TDOT; TN RC&D; TWRA; TVA; USACE; USDI-F&WS; USDI-OSM; USDA-NRCS; UT-CTAS
 Year(s): 2001 – 2005
- **Action 2:** Increase REWG membership by one member each year.
 Lead: TDA-NPS Program
 Key partners: Mining companies; Local landowners; Local SCDs; TDEC-TOGB; TDEC-WPC-LRS; TDEC-WPC-MS; TDOT; TN RC&D; TWRA; TVA; USACE; USDI-F&WS; USDI-OSM; USDA-NRCS; UT-CTAS
 Year(s): 2001 – 2005
- **Action 3:** Establish the REWG mission statement, a list of collective capabilities, and priorities for funding.
 Lead Agencies: REWG and TDA-NPS Program
 Key partners: Mining companies; Local landowners; Local SCDs; TDEC-TOGB; TDEC-WPC-LRS; TDEC-WPC-MS; TDOT; TN RC&D; TWRA; TVA; USACE; USDI-F&WS; USDI-OSM; USDA-NRCS; UT-CTAS
 Year(s): 2001-2005
- **Action 4:** Work with other agencies to develop a prioritization list of non-coal projects for reclamation.
 Lead Agencies: REWG and TDA-NPS Program
 Key partners: Mining companies; Local landowners; Local SCDs; TDEC-TOGB; TDEC-WPC-LRS; TDEC-WPC-MS; TDOT; TN RC&D; TWRA; TVA; USACE; USDI-F&WS; USDI-OSM; USDA-NRCS; UT-CTAS
 Year(s): 2001-2005

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- **Action 5:** Create a non-coal reclamation program.
 Lead: REWG & TDA-NPS Program
 Key partners: County government; Mining companies; Local landowner; Local SCDs; TDEC-DCA/SRF; TDEC-TOGB; TDEC-WPC-LRS; TDEC-WPC-MS; TDEC&CD; TDOT; TN RC&D; TWRA; TVA; USACE; USDI-F&WS; USDI-OSM; USDA-NRCS; UT-CTAS; Watershed assoc.
 Year(s): 2001-2005
- **Action 6:** Develop Memoranda of Agreement with key federal agencies to improve programmatic consistency.
 Lead: TDA-NPS Program
 Key Partners: All federal agency partners
 Year(s): 2001-2005

Long Term Goal 2.

Fully implement all developed TMDLs for nonpoint sources in compliance with existing regulations, policies, or agreements by 2015.

- **Action 1:** Coordinate water quality remediation efforts between TDEC-WPC and TDA-NPS Program with the development of resource extraction-related TMDLs, researching a unified approach in setting TMDL standards.
 Lead: TDEC-WPC & TDA-NPS Program
 Key partners: TDEC-WPC-LRS; USDI-F&WS; USDI-OSM
 Year(s): 2001
- **Action 2:** Continue interagency coordination of TMDL development and initiate remediation efforts based on TMDL direction.
 Lead:
 Key Partners: TDEC-WPC-LRS; USDI-F&WS; USDI-OSM
 Year(s): 2015,
- **Action 3:** Continue interagency coordination of TMDL development and initiate remediation efforts based on TMDL direction.
 Lead:
 Key Partners: TDEC-WPC-LRS; USDI-F&WS; USDI-OSM
 Year(s): 2010
- **Action 4:** Continue interagency coordination of TMDL development and initiate remediation efforts based on TMDL direction.
 ➤ Action: Practice close TMDL coordination with TDEC-WPC.
 Lead: TDEC-WPC & TDA-NPS Program
 Key partners: TDEC-WPC-LRS; USDI-F&WS; USDI-OSM
 Year(s): 2005

Long Term Goal 3.

Restore all waters impaired by nonpoint sources that are listed on the 1998 303(d) List to the condition of fully supporting their designated uses by 2015, in cooperation with local, state and federal partners.

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- **Action 1:** 20% of the streams impaired due to resource extraction on the 1998 303(d) List will support their designated uses.
 Lead Agencies: TDEC-WPC and TDA-NPS Program
 Key partners: Local SCDs; TDEC-WPC-LRS; TWRA; TVA; USDI-OSM
 Year(s): 2005
- **Action 2:** 40% of the streams impaired due to resource extraction on the 1998 303(d) List will support their designated uses.
 Lead Agencies: TDEC-WPC and TDA-NPS Program
 Key partners: Local SCDs; TDEC-WPC-LRS; TWRA; TVA; USDI-OSM
 Year(s): 2010
- **Action 3:** 60% of the waters listed on the 1998 303(d) List due to resource extraction will support their designated uses.
 Lead: TDEC-WPC-LRS
 Key Partners: Local SCDs; TWRA; TVA; USDI-OSM
 Year(s): 2015
- **Action 4:** Cooperate with TDEC-Oil & Gas Board to plug abandoned wells and reclaim their locations for those found in 1998 303(d) Listed streams.
 Lead Agencies: TDEC-O&GB & TDA-NPS Program
 Key partners: TDEC-DWS-GWM
 Year(s): 2001-2005
- **Action 5:** Cooperate with TDEC-Oil & Gas Board to plug abandoned wells and reclaim their locations for those found in 303(d) listed streams.
 Lead: TDEC-O&GB & TDA-NPS Program
 Key partners: TDEC-DWS-GWM
 Year(s): 2001-2005

Long Term Goal 4.

Beginning in 2006, through regulatory and non-regulatory means, prevent previously unlisted waters from being included on the 303(d) List because of nonpoint source impairments.

- **Action 1:** Implement BMPs on streams not listed on the 303(d) List
 Lead: REWG & TDA-NPS Program
 Key partners: County government; Mining companies; Local landowner; Local SCDs; TDEC-DCA/SRF; TDEC-TOGB; TDEC-WPC-LRS; TDEC-WPC-MS; TDEC&CD; TDOT; TN RC&D; TWRA; TVA; USACE; USDI-F&WS; USDI-OSM; USDA-NRCS; UT-CTAS; Watershed assoc.
 Year(s): 2001-2005
- **Action 2:** No waters will not support their designated uses because of resource extraction.
 Lead: TDEC-WPC-LRS and TDA-NPS Program
 Key partners: Local SCDs; TWRA; TVA; USDI-OSM
 Year(s): 2015

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Long Term Goal 5.

Improve the knowledge of stakeholders and citizens concerning the origins, magnitude, and prevention of nonpoint source pollution, and how to prevent it.

- **Action 1:** Correspond with other coal producing states to learn innovative techniques and approaches to addressing resource extraction problems.
Lead: REWG & TDA-NPS Program
Key partners: County government; Mining companies; Local landowner; Local SCDs; TDEC-TOGB; TDEC-WPC-LRS; TDEC-WPC-MS; TN RC&D; TVA; USACE; USDI-OSM; USDA-NRCS
Year(s): 2001-2005
- **Action 2:** Demonstration projects will be initiated to address AML re-mining, and gravel pit, barite, ball clay, and phosphate mine reclamation.
Lead: TDA-NPS Program
Key partners: TDEC-WPC-LRS; TDEC-DCA; TDEC&CD; TACD; TN RC&D ; TWRA; USDA-NRCS; USDI-OSM
Year(s): 2001-2005
- **Action 3:** Develop/distribute resource extraction educational material to the general public, and especially to persons in areas affected by extraction.
Lead: TDA-NPS Program
Key partners: TDEC-WPC-LRS; TWRA; USDA-NRCS; USDI-OSM; UTIA; USDI-FWS
Year(s): 2001-2005
- **Action 4:** Through 319 demonstration projects across the state, encourage local entities to create funding partnerships to remediate abandoned mine sites which are affecting local water quality.
Lead: TDA-NPS Program
Key partners: TDEC-WPC-LRS; TDEC-DCA; TDEC-EPO; TDEC&CD; TWRA; TNRC&Ds; SCDs; TACD; Co. highway dept.; Develop. Districts; TVA; USDI-F&WS; UT-CTAS; Dana Fund
Year(s): 2001-2005

Long Term Goal 6.

Through the process of continuous improvement, routinely assess all programmatic functions of the TDA-NPS Program in order to maximize efficiency, decrease the bureaucratic burden and increase the numbers of participants in the program.

- **Action 1:** Investigate other funding sources such as The Nature Conservancy, Brownfields Program, as well as EPA.
Lead: TDA-NPS Program
Key partners: TDEC-WPC-LRS; The Nature Conservancy; US EPA
Year(s): 2001-2005

Long Term Goal 7.

Use the maximum allowable percentage of funding annually to assist partners with water quality monitoring and assessment, for the duration of the 319 program.

See Chapter 1.9 for action items related to water quality monitoring for the TDA-NPS Program.